

FLEISCHMANNIA AND CONOCLINIUM  
(COMPOSITAE, EUPATORIEAE)  
IN EASTERN NORTH AMERICA

JEAN W. WOOTEN AND ANDRÉ F. CLEWELL

King and Robinson (1970a-e) have fragmented the large and variable genus, *Eupatorium* L., placing the great majority of the species in a number of other genera. Grashoff and Turner (1970) contended that the segregate genera were poorly defended by King and Robinson and that the reliability of the microcharacters, which were liberally used in generic circumscription by King and Robinson, has yet to be determined. On the basis of gross morphology, chromosome number, and distribution, we feel that the removal of several North American species from *Eupatorium* into the segregate genera as proposed by King and Robinson will result in a more natural and less unwieldy classification. On the other hand, our knowledge is largely limited to the North American taxa. We realize that additional studies on the many neotropical species might precipitate further generic realignments.

The eastern North American species which are usually considered as members of *Eupatorium* have been assigned to five genera. King and Robinson (1970e) retained 21 species in *Eupatorium*; a few others omitted by King and Robinson, e.g., *E. compositifolium* Walt., should probably be added. The four verticillate-leaved species were transferred to *Eupatoriadelphus* (King and Robinson, 1970d). Three additional species, including the white snakeroot, are now placed in *Ageratina* (Clewell and Wooten, 1971). One species each has been placed in *Fleischmannia* and *Conoclinium* (King and Robinson, 1970a, c). These latter two species are the subject of the present paper.

Plants of both species were observed in natural populations in Leon County, Florida. Seeds from these populations germinated immediately without pretreatment and were grown in a greenhouse. Buds and root tips were also ob-

tained and fixed in Carnoy's fluid for cytological analysis, and were later squashed and stained with aceto-orcein. Dried specimens were examined from the following herbaria: FLAS, FSU, GA, GH, ILLS, IND, ISC, KSC, KY, LAF, MICH, MO, NEBC, NO, NY, OKL, OS, PAC, SMU, TENN, TEX, UMO, UNC, VDB, VPI, WVA, Georgia Southern College, and the University of Mississippi. Drawings of plants were made by Barbara N. Culbertson.

**Fleischmannia incarnata** (Walt.) R. M. King & H. Robinson, *Phytologia* 19: 203. 1970.

*Eupatorium incarnatum* Walt., *Fl. Car.* 200. 1788.

*Kyrstenia incarnata* (Walt.) Greene, *Leaflets Bot. Obs. Crit.* 1: 8. 1903.

Stems weak, often sprawling, puberulent, up to ca. 1.5 m long; leaves opposite, membranous, deltoid, usually narrowly so, the largest blades up to 2-8 cm long, sparsely to moderately pilose, sometimes glandular-punctate beneath, apices acute or nearly acuminate, bases truncate, sometimes subcordate or broadly cuneate, margins crenate or uncommonly nearly serrate, the teeth sometimes irregular in size and shape on the same leaf, the largest blades 1.5-3 times longer than their petioles; heads borne in moderately dense to loose corymbs, some of the terminal pedicels being at least 4 mm long and (in the Southwest) up to 25 mm long, each head bearing ca. 20-23 flowers; involucre comprised of 15-18 phyllaries, imbricated towards the base and arranged in 3 or 4 series: the outer 1 or 2 series comprised of usually 3-5, ovate-cuspidate or lanceolate, short phyllaries ca. 2 mm long (appearing similar to the 2 or 3 bracts closely subtending the involucre), the inner 2 series comprised of 12 or 13 phyllaries, (3-)4-5 mm long, subequal, linear-acuminate or acute and 2-nerved or narrowly oblong-mucronate (uncommonly obtuse) and weakly nerved, sparsely pubescent; corollas 2-3 mm long, tubular, constricted at the base at anthesis, the lobes mostly 1/4-1/6 as long as the tube, lavender, glabrous, sometimes finely glandular-punctate beneath (best seen in bud), the tube white, often with purple

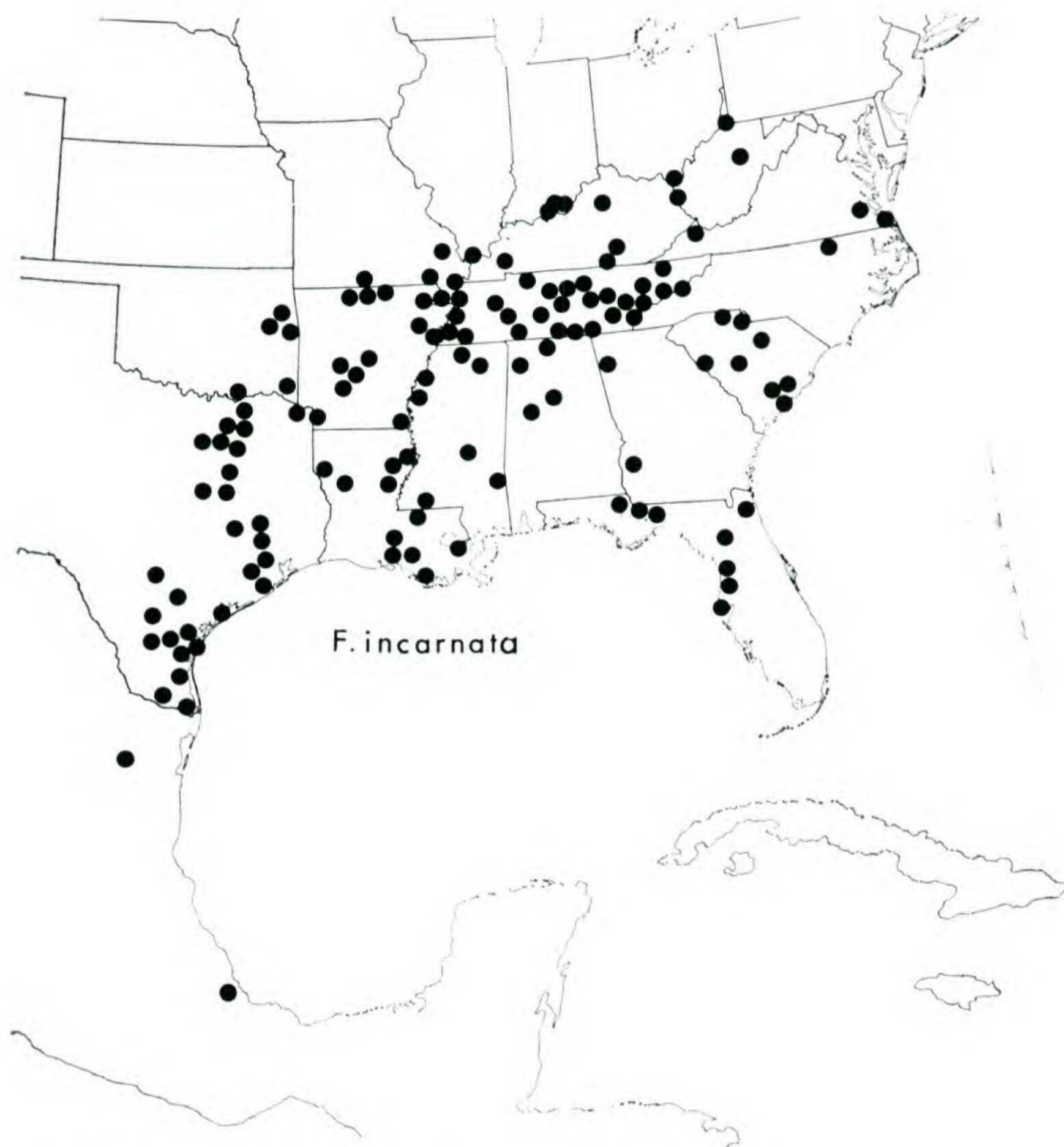
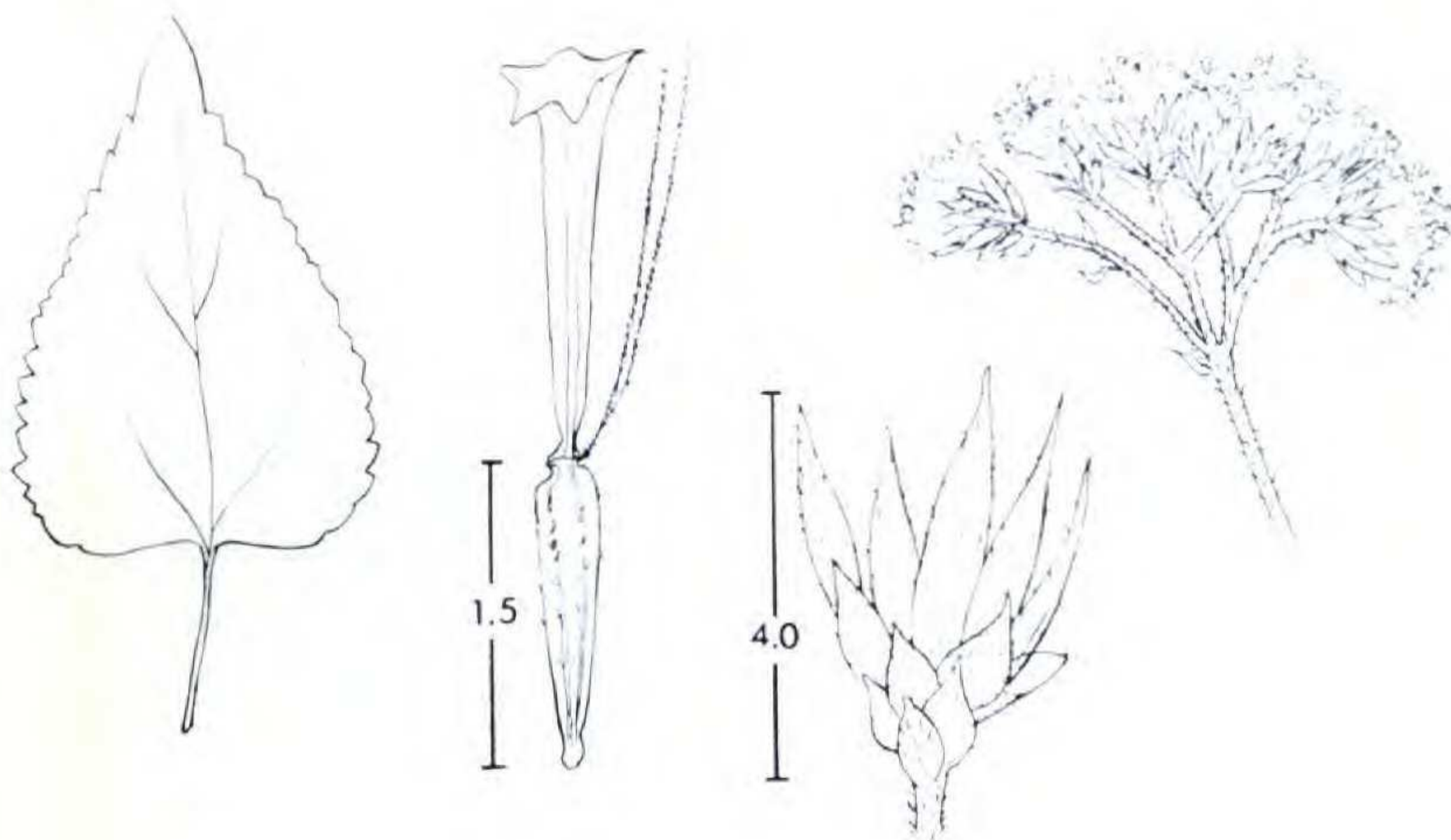
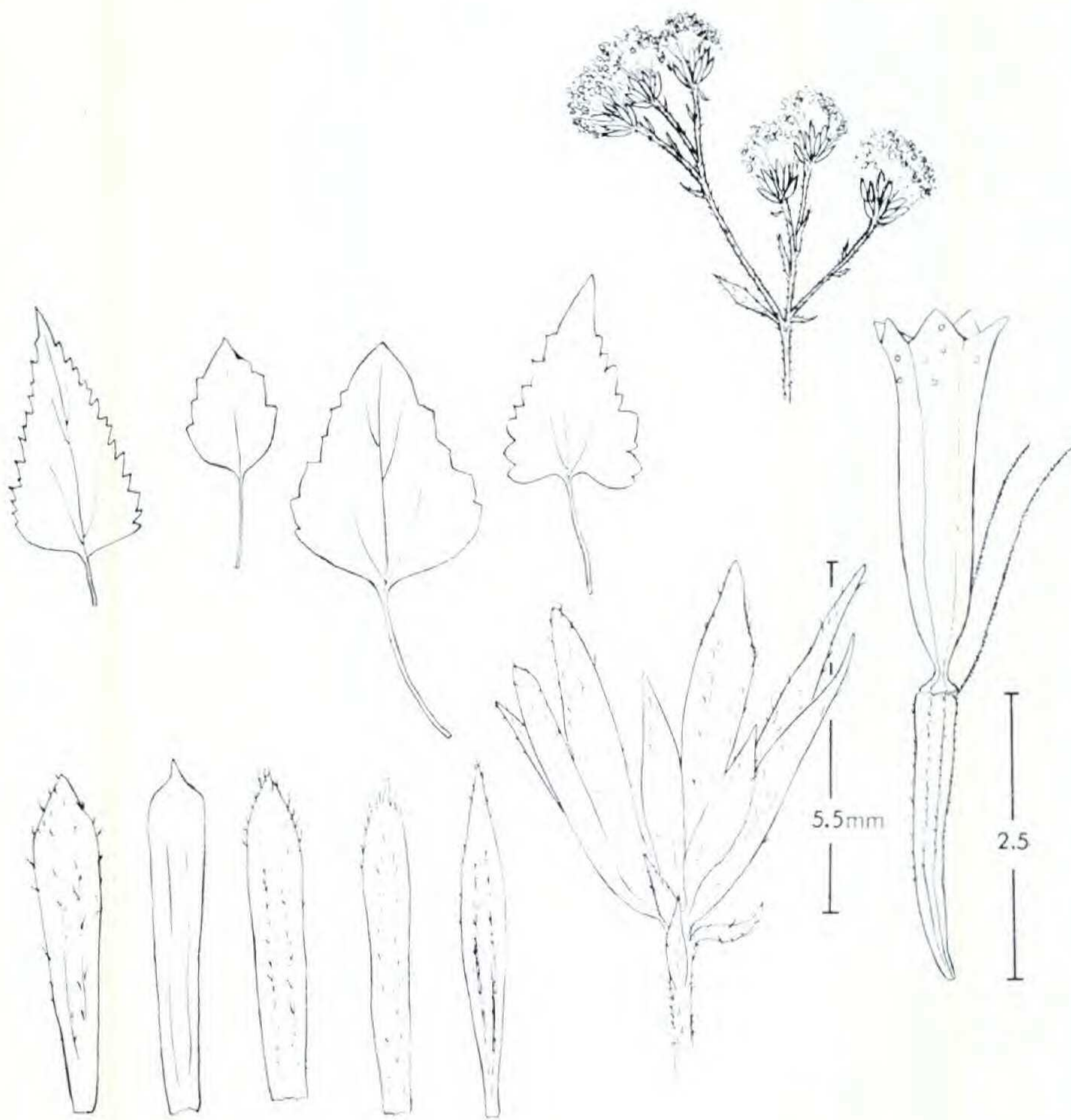


Figure 1. Distribution by county of *Fleischmannia incarnata*.

---

Figure 2. *Fleischmannia incarnata* (above), including a fertile branch, an involucre, four leaves, five phyllaries, and a flower lacking all but two of its pappus bristles; and *Fleischmannia pycnocephala* (below), including a fertile branch, a leaf, an involucre, and a flower lacking all but two of its pappus bristles.



stripes; achenes 1.5-2.5 mm long, glabrous or sparsely short-pubescent on the ribs;  $n = 10$ ,  $2n = 20$ .

Plants of moist or mesic habitats and probably closely associated with calcareous soils: deciduous woods, frequently burned pineland, bluffs, margins of ponds, creeks, and swamps, cedar glades, limestone ledges, prairies, old fields, and roadsides. Distributed mostly in isolated populations in South Carolina, Tennessee, Arkansas, Louisiana, eastern Oklahoma, Texas, and in Mexico, in the states of Nuevo Leon and Veracruz; also scattered southward through the Gulf states to central Florida and northward to southern Virginia, West Virginia, and the southern portions of Ohio, Indiana, Illinois, and Missouri (Figs. 1 & 2). Flowering mostly from September into early November; occasionally as early as late March and, in central Florida, as late as early December.

Plants of *Fleischmannia incarnata* can be mistaken for those of *F. pycnocephala* (Less.) King & Robinson (= *Eupatorium pycnocephalum* Less.), a species of South and Central America, which extends into the deserts of the southwestern United States. The latter species is distinguished by the following characters: corymbs dense with terminal peduncles only 1-3 (-4) mm long, phyllaries broadly oblong-obtuse or sometimes acute, and corollas 1.5-2 mm long (Fig. 2). *Fleischmannia pycnocephala* belongs to the *F. microstemon* (= *Eupatorium microstemon*) species aggregate studied by Baker (1967).

Chromosome numbers were determined in three plants from Leon County, Florida. From a root tip of FPl, 20 somatic chromosomes were observed, agreeing with a count by Grant (1953) for this species. Ten meiotic bivalents were counted in TT4-10, and 10 meiotic bivalents plus two pairs of accessory chromosomes were seen in GC9-8. The accessory chromosomes were roughly half the size of those of the regular complement, and they tended to lie off the spindle during the first meiotic division. They were highly heterochromatic and appeared shiny when viewed with phase contrast optics during diakinesis and metaphase I.

**Conoclinium coelestinum** (L.) DC., Prod. 5: 135. 1836.

*Eupatorium coelestinum* L., Sp. Pl. 838. 1753.

*Conoclinium dichotomum* Chapman, Coult. Bot. Gaz. 3: 5. 1878.

*Eupatorium coelestinum* f. *illinoense* Benke, Rhodora 35: 46. 1933.

*Eupatorium coelestinum* f. *album* E. J. Alexander, Castanea 5: 93. 1940.

Plants perennial, rhizomatous; stems herbaceous, often purplish, erect to decumbent, occasionally rooting at the nodes, up to ca. 1.5 m long, somewhat glandular-punctate, glabrate to short-villous, on new growth commonly minutely and densely puberulent; leaves opposite, membranous, mostly narrowly deltoid, deltoid-ovate, or nearly lanceolate, the longest blades up to 3-13 cm long, densely glandular-punctate beneath, glabrous to puberulent or hispidulous, apices acute or obtuse, bases subcordate to broadly cuneate, sometimes slightly hastate, margins crenate or crenate-seriate, blades of the larger leaves 2-5 times longer than their petioles, the petioles and veins sometimes purplish; heads borne in compact corymbs and bearing 40-90 flowers on a distinctly conical receptacle; involucre of 3 or 4 imbricated series of 22-32 similar phyllaries: the phyllaries of the outer series shortest (1.5-2.5 mm long) and those of the inner series longest (3-5 mm long); phyllaries linear-acuminate with the ends inwardly curved, glabrous or strigose, eglandular to moderately glandular-punctate, especially near the base, purple-tipped, 2-nerved, often with a narrow purple strip between the nerves; corollas tubular, 2-3 mm long, the lobes purple, 4-8 times shorter than the tube, glandular-punctate beneath, the tubes white, sometimes with purple stripes, sparsely glandular; achenes 1-1.8 mm long, glabrous, often glandular; pappus of ca. 25 bristles;  $n = 10$ ,  $2n = 20$ .

Plants mostly of moist, open or semi-shaded habitats: banks of streams, ponds, and springs, in wet woods, dry creek beds, swamps, marshes, bogs, and pine flatwoods, and along roadsides; less commonly in dry woods (e.g., oak-

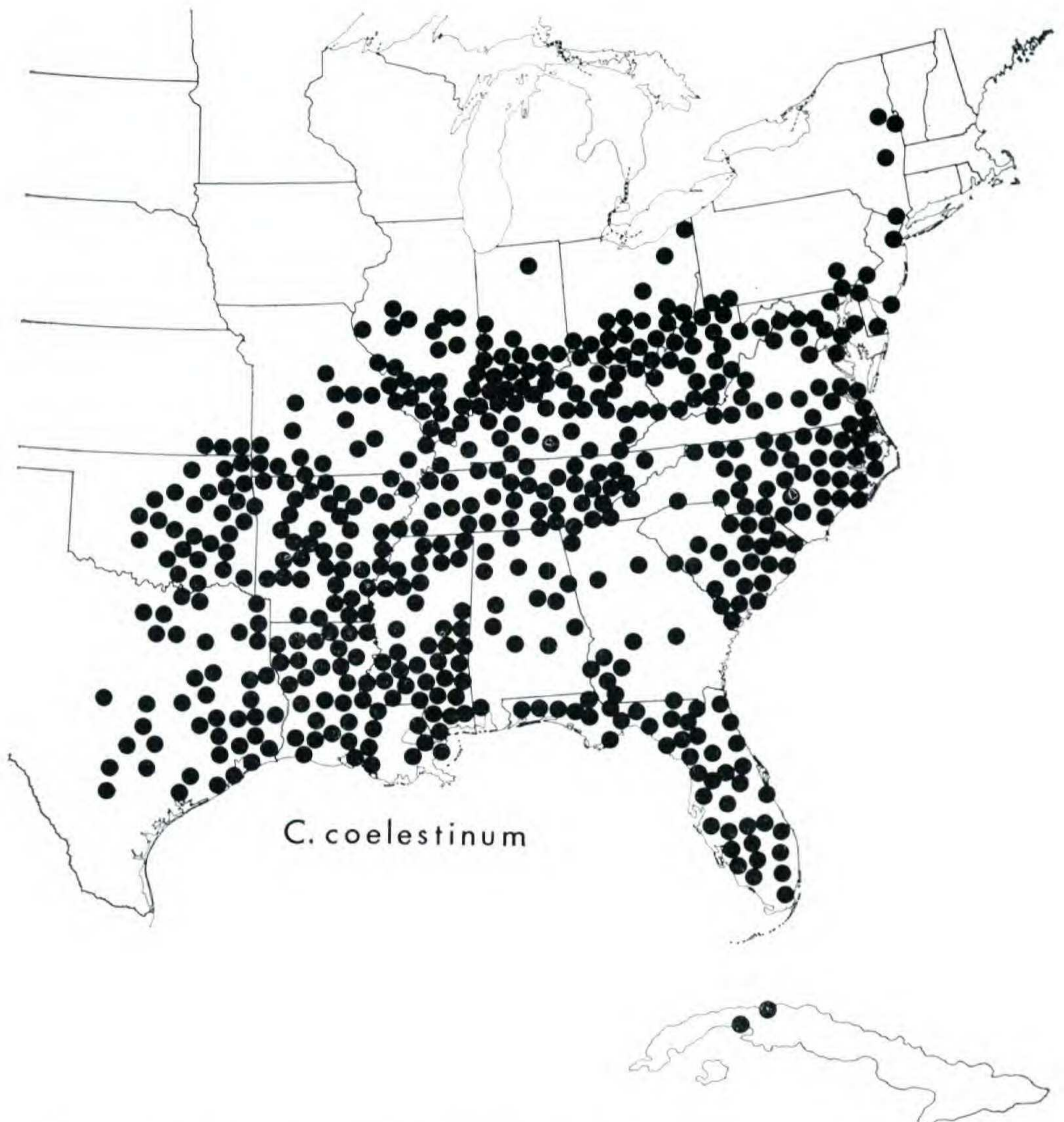


Figure 3. Distribution by county of *Conoclinium coelestinum*.

hickory, pine-oak-hickory, and upland, frequently burned pinelands) and old fields. Southern New Jersey and Pennsylvania west to central Missouri, southeastern Kansas, and eastern Oklahoma, south to Florida, eastern Texas, and Cuba (Figs. 3 & 4). Flowering mostly from September through October but sometimes as early as late April. Flowering later in southern regions and throughout the year in southern Florida.

Plants from peninsular Florida consistently have short

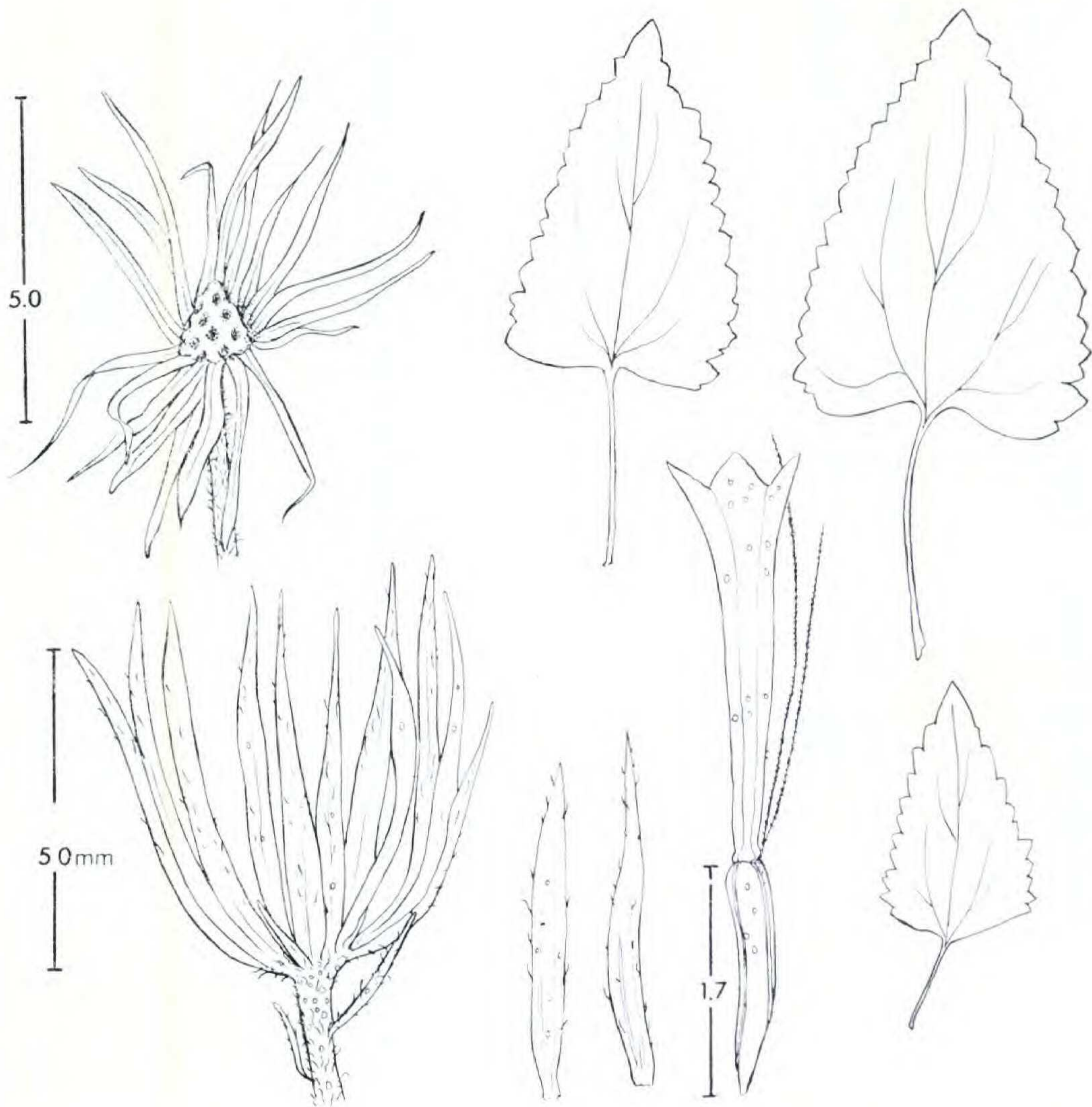


Figure 4. *Conoclinium coelestinum*, including two involucre, three leaves, two phyllaries, and one flower lacking all but two of its pappus bristles.

leaves and are identifiable as *Conoclinium dichotomum* Chapman; plants of this species were originally described as having leaves 1-1 1/2 inches long. The name *E. coelestinum* f. *illinoense* was applied to plants with rich red-purple flowers, and f. *album* to rare, white-flowered plants.

We counted 10 bivalents at meiosis in three plants from Leon County, Florida (GC10-9, TT17-2, FP3). Grant (1953) also reported 20 somatic chromosomes.



## REFERENCES

- BAKER, H. G. 1967. The evolution of weedy taxa in the *Eupatorium microstemon* species aggregate. *Taxon* **16**: 293-300.
- CLEWELL, A. F., & J. W. WOOTEN. 1971. A revision of *Ageratina* (Compositae, Eupatorieae) from eastern North America. *Brittonia* **23**: 123-143.
- GRANT, W. F. 1953. A cytotaxonomic study in the genus *Eupatorium*. *Amer. Jour. Bot.* **40**: 729-742.
- GRASHOFF, J., & B. L. TURNER. 1970. "The new synantherology" — a case in point. *Taxon* **19**: 914-917.
- KING, R. M., & H. ROBINSON. 1970a. Studies in the Eupatorieae (Compositae). XVIII. New Combinations in *Fleischmannia*. *Phytologia* **19**: 201-207.
- & —————. 1970b. Studies in the Eupatorieae (Compositae). XIX. New combinations in *Ageratina*. *Phytologia* **19**: 208-229.
- & —————. 1970c. Studies in the Eupatorieae (Compositae). XIII. The genus *Conoclinium*. *Phytologia* **19**: 299-300.
- & —————. 1970d. Studies in the Eupatorieae (Compositae). XXV. A new genus *Eupatoriadelphus*. *Phytologia* **19**: 431-432.
- & —————. 1970e. *Eupatorium*, a composite genus of arcto-tertiary distribution. *Taxon* **19**: 769-774.

DEPARTMENT OF BOTANY AND PLANT PATHOLOGY  
IOWA STATE UNIVERSITY, AMES

DEPARTMENT OF BIOLOGICAL SCIENCE  
FLORIDA STATE UNIVERSITY, TALLAHASSEE